

Expert Report of Greg Karras

Communities for a Better Environment (CBE)

5 December 2014

Regarding the

Phillips 66 Company Propane Recovery Project

Recirculated Draft Environmental Impact Report (RDEIR)

Released in October 2014 by the Contra Costa County

Department of Conservation and Development

State Clearinghouse #2012072046

County File #LP12-2073

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I, Greg Karras, declare and say:

1. I reside in unincorporated Marin County and am employed as a Senior Scientist for Communities for a Better Environment (CBE). My duties for CBE include technical research, analysis, and review of information regarding industrial health and safety investigation, pollution prevention engineering, pollutant releases into the environment, and potential effects of environmental pollutant accumulation and exposure.

Qualifications

2. My qualifications for this opinion include extensive experience, knowledge, and expertise gained from nearly 30 years of industrial and environmental health and safety investigation in the energy manufacturing sector, including petroleum refining, and in particular, refineries in the San Francisco Bay Area.

3. Among other assignments, I served as an expert for CBE and other non-profit groups in efforts to prevent pollution from refineries, to assess environmental health and safety impacts at refineries, to investigate alternatives to fossil fuel energy, and to improve environmental monitoring of dioxins and mercury. I served as an expert for

CBE in collaboration with the City and County of San Francisco and local groups in efforts to replace electric power plant technology with reliable, least-impact alternatives. I served as an expert for CBE and other groups participating in environmental impact reviews of related refinery projects, including, among others, the Chevron Richmond refinery “Modernization Project” now subject to review pursuant to a California Court of Appeals Order,¹ and the Phillips 66 “Rail Spur Extension and Crude Unloading Project” now before San Luis Obispo County.² I serve as an expert for CBE in collaboration with community, labor, and other groups in a project involving investigation of environmental health and safety impacts of, and alternatives to, refining lower quality crude oils.

4. I authored a technical paper on the first publicly verified pollution prevention audit of a California petroleum refinery in 1989 and the first comprehensive analysis of refinery selenium discharge trends in 1994. I authored an alternative energy blueprint, published in 2001, that served as a basis for the Electricity Resource Plan adopted by the City and County of San Francisco in 2002. From 1992–1994 I authored a series of technical analyses and reports that supported the successful achievement of cost-effective pollution prevention measures at 110 industrial facilities in Santa Clara County. I authored the first comprehensive, peer-reviewed dioxin pollution prevention inventory for the San Francisco Bay, which was published by the American Chemical Society and Oxford University Press in 2001. In 2005 and 2007 I co-authored two technical reports that documented air quality impacts from flaring by San Francisco Bay Area refineries, and identified feasible measures to prevent these impacts.

5. My recent publications include the first peer reviewed estimate of combustion emissions from refining denser, more contaminated ‘lower quality’ oil based on data from U.S. refineries in actual operation, which was published by the American Chemical Society in the journal *Environmental Science & Technology* in 2010, and a follow up study that extended this work with a focus on California and Bay Area refineries, which was peer reviewed and published by the Union of Concerned Scientists in 2011. I also presented invited testimony on *inherently safer systems* requirements for existing refineries that change crude feedstock at the U.S. Chemical Safety Board’s public hearing on the Chevron Richmond refinery fire that was held on 19 April 2013. My CV and list of publications were submitted with my September 2013 report in this matter.

¹ See *CBE v. City of Richmond* 184 Cal_App.4th.

² See also Contra Costa Pipeline Project file, County File #LP072009, SCH #2007062007.

Scope of Review

6. In my role at CBE I have reviewed the Phillips 66 Company ‘Propane Recovery Project’ Recirculated Draft Environmental Impact Report (RDEIR), ‘Rail Spur Extension and Crude Unloading Project’ Revised Draft Environmental Impact Report (Rail Spur RDEIR),³ ‘Throughput Increase Project’ Final EIR (Throughput Increase FEIR),⁴ and the projects or project components discussed in those documents. I commented previously in this matter and reassert my previous comments⁵ as they remain valid and have not been addressed in the RDEIR. My review of the project and RDEIR reported herein is focused on the adequacy of the project description and analysis in the RDEIR for evaluating potential environmental impacts of the project. My opinions on these matters and the basis for these opinions are stated in this report.

Changes to the Project

7. The RDEIR describes the project differently from the DEIR in several ways that are identifiable from detailed review but are not discussed in the RDEIR as changes in the project description or changes in the project. These changes involve the *amounts* of propane and butane (LPG) to be recovered, the *sources* of that LPG, the *streams* to be hydrotreated, and the *scope* of cooling system changes. Each is discussed in turn below.

8. Amounts of propane and butane that the project could recover were described as 4,200 barrels per day (b/d) of propane and an additional 3,800 b/d of butane in the DEIR. In contrast, the RDEIR asserts *both* a draft air permit limit on the lump sum of propane and butane to be recovered (14,500 b/d LPG; RDEIR at 3-31, 3-33) *and* a project design basis of 5,580 b/d propane and 4,996 b/d additional butane (15,474 b/d LPG including the butane that is already recovered; RDEIR at 3-33, 3-34). No irrevocable commitment to retain the proposed 14,500 b/d permit limit throughout the 30–50 year expected operation of the project is asserted or documented. The RDEIR does not note that the design basis is thus relevant to potential impacts, or explain this change to the project in its text.

³ ‘Rail Spur’ proposal; SCH #2013071028; now pending before San Luis Obispo County.

⁴ ‘Throughput Increase’ proposal; SCH #20081010111; now pending final project approval.

⁵ My 4 Sep 2013 report regarding this matter (Karras Rodeo Report-1), 7 Jan 2014 Supplemental Evidence–B, 14 Jan 2014 Supp. Evidence–C, 20 Jan 2014 Supp. Evidence–D (co-authored with Roger Lin), and 24 Nov 2014 report regarding the ‘Rail Spur Extension and Crude Unloading Project’ (Karras Rail Spur Report) are appended hereto as attachments 1, 2, 3, 4, and 5, respectively. Exhibit 1 of my Rail Spur report is appended hereto as Karras Exhibit 1.

9. Sources of the LPG to be recovered, as described in the DEIR, did *not* include several streams feeding ‘RFG-A.’ (DEIR Figure 3-6.) These ‘RFG-A’ streams are now included among those from which LPG could be recovered. (RDEIR Figure 3-6.) This change in the project description reveals undisclosed changes in hydrogen plant feed and further implicates feedstock from the Santa Maria facility (see figs. 3-4, 3-6), but the RDEIR includes no discussion of any potential effects from this change in the project.
10. Additional hydrocarbon streams would be treated by the proposed new hydrotreater, but this change and its implications are not discussed in the RDEIR. Naphtha streams from the heavy gas oil hydrocracker (Unit 246) and the ULSD diesel hydrotreater (U250) are fed to reforming units U231 and U244 now, but the revised project description would instead route them through the new hydrotreater. (Compare DEIR and RDEIR figures 3-4, 3-5, and 3-6.)
11. The project would modify the Rodeo facility’s antiquated once-through cooling (OTC) system and those modifications would include, among other things, new heat exchangers. However, cooling system changes described in the DEIR were limited to cooling the proposed new propane *recovery* (DEIR at 3-27) while the RDEIR appears to expand this description to cover all cooling “demands for the proposed Project.” (RDEIR at 3-37.) The RDEIR’s text does not mention or explain this change in the project description. This omission further compounds its lack of disclosure regarding the process sources and amount of the additional heat to be transferred to the San Francisco Bay.

Feedstock Change

12. Changes in the type, quantity, and quality (e.g., density, distillation properties, LPG content, hydrogen content, sulfur content, metals content, organic acids content) of crude oil processed are not disclosed in the RDEIR. Crude oil is the basic feedstock of oil refining. This nondisclosure is a fundamental flaw in the RDEIR.
13. The RDEIR asserts that the project would not have “any effect on the types and/or quantities of crude oil feedstocks that can be processed,” does not “propose to add, change, or modify the operation of other process units, such as the coker” (RDEIR at 3-28), and “has no connection to the transportation of crude oil by rail” (RDEIR at 3-7). These assertions are unsupported, misleading, and incorrect. Crude is the feedstock for

this LPG production. Feedstock and products are key process variables that are fundamentally interrelated. Phillips 66 and other California refiners are switching to different crude feedstock sources at present. Crude from different sources can yield different amounts of propane and butane in refinery distillation processes, and in refinery cracking processes such as coking and hydrocracking. These connections between refinery crude feeds, processing, and LPG production are beyond reasonable dispute. Moreover, Phillips 66 does, in fact, propose to change (increase) coking and other processing of new types of crude brought in by rail.

14. Phillips 66 proposes to increase coking and other processing rates via its ‘Throughput Increase Project, which would increase its Santa Maria Facility (SMF) crude processing rate.’⁶ Because the SMF cannot make gasoline, diesel or jet fuel and sends all the semi-refined crude liquids it produces to Rodeo for further processing, that would necessarily increase the volume of oil from the SMF that would be processed at Rodeo.⁷ Some of this increasing oil volume from the SMF would be processed by the Rodeo coking unit U200, its hydrocracking units U240 and U246, and its diesel hydrotreater U250 (after U240 ‘Prefrac’ distillation; see ‘SMGO,’ RDEIR Figure 3-4). The RDEIR fails to disclose this proposed change in the operation of the coker and other refinery process units to process larger amounts of crude delivered through the SMF.

15. As stated, crude feedstock yields LPG from distillation (e.g., ‘prefractionation’) and also from cracking (e.g., coking and hydrocracking). Thus, SMF crude inputs are connected to the Rodeo LPG recovery proposal through distillation and cracking of the semi-refined oils sent from the SMF to Rodeo to finish the processing needed to make gasoline, diesel and jet fuel from crude. Phillips 66 currently proposes to receive this crude feedstock at the SMF by rail.⁸ Therefore, its assertion that the project “has no connection to the transportation of crude oil by rail” is a clear error in the RDEIR.

16. The publicly verifiable data in the record indicate that insufficient propane and butane is recoverable in the project baseline to implement the project without additional cracking process feedstock, additional LPG-rich feedstock, or both. My past comments and those of others raised and documented this finding.⁹ Estimates based on publicly

⁶ See Throughput Increase FEIR; see also Rail Spur RDEIR at 2-35 (pending final approval).

⁷ See Karras Rail Spur Report at paragraphs 15–28.

⁸ See Rail Spur RDEIR; currently in CEQA review before San Luis Obispo County.

⁹ See attachments 1, 3, 4; reports and comments of P. Fox on the LPG and Rail Spur projects.

verifiable, plant-specific data for LPG recoverable with available technology indicate that roughly half Phillips' proposed LPG recovery capacity would be idled in these 'baseline' conditions.¹⁰ Unfortunately, instead of reporting and analyzing publicly verifiable data on current and potential sources of recoverable LPG, the RDEIR dismisses this evidence with unsupported and contradictory assertions. The RDEIR's revised estimate now tacitly admits a small baseline LPG shortfall below project design capacity, ranging from 10–31% of this capacity being idled, depending upon the averaging period chosen.¹¹ However, the RDEIR estimate is not supported by publicly verifiable data, overestimates the baseline by applying maximum conditions as average ones for at least some streams, and further inflates the baseline by including LPG streams that are not feasible to recover in its 'recoverable' estimate.¹² Compounding its errors, the RDEIR omits industry-wide data revealing that its estimate appears improbably high.¹³ Thus, rather than any 'battle of experts' problem, the RDEIR simply ignores all the data refuting its conclusion on this key point while including no supporting data, but its analysis appears misleading in another way as well. Instead of a typical 'baseline' period before the project notice, it asserts an LPG estimate for 2013 (RDEIR at 3-35), a year when the refinery had already begun to boost crude feedstock volume, and did so at least in part on new tar sands oil feedstock¹⁴—the very same change it insists has nothing to do with the project.

17. The RDEIR's new assertion that "no new butane or propane can be added to the semi-refined products sent from the" SMF because of "vapor pressure limits" on storage tanks along the company's proprietary pipeline from the SMF to Rodeo¹⁵ is unsupported, erroneous, and misleading. This assertion is not supported by even a shred of data in the RDEIR—and it is improbable, as the naphtha (pressure distillate) and gas oils produced and sent by the SMF would be expected to have vapor pressures well below the limits cited. Data the RDEIR *should* have included but did not show this assertion is wrong.

¹⁰ See attachments 1, 3, 4; reports and comments of P. Fox on the LPG and Rail Spur projects.

¹¹ RDEIR at 3-33 through 3-35, reporting unsupported total LPG averages of ≈10,600 b/d (month of Dec 2013) and 13,970 b/d (2013-annual) vs. a project design basis of 15,474 b/d.

¹² See attachments 1, 3, 4; and the reports and comments of P. Fox, *esp.* on Refinery Manager Evans' 6 Jan 2014 *Response to Appeals*. Note also that 'RFG-A' streams the RDEIR estimate includes were *not* fed to LPG recovery before the project description changed (see paragraph 9).

¹³ See Att. 3 at 1 (*maximum monthly* West Coast yield less than half claimed Rodeo *annual* yield).

¹⁴ See Rail Spur RDEIR at 2-35 (compare 2010–2012 vs. 2013 SMF crude throughputs) and 2-31 (SMF crude feed has been up to 7% bitumen-derived 'dilbit' crude "for about one year").

¹⁵ RDEIR at 3-25, 3-26; see also Phillips SFR Manager's 1/6/14 'Response to Appeals.'

(See Fox SMF Rpt-2.)¹⁶ The tanks are controlled and thus exempt from the claimed vapor limits, their measured vapor pressures are far below the claimed limits, or both. (Id.) This assertion also ignores—and distracts attention away from—the LPG feedstock sent to Rodeo not as LPG, but as gas oils and pressure distillate/naphtha that yield significant amounts of LPG during processing at Rodeo.

18. Ultimately, the RDEIR's assertion that the project “would not require the Refinery to change the basic feedstocks that are currently received and processed” because it “does not propose to increase the production of propane or butane”¹⁷ is unsupported and inaccurate because it ignores ongoing changes in crude feedstock. This existing condition is a known impetus for projects at the refinery that has been acknowledged by San Luis Obispo County¹⁸ and by Phillips 66 itself.¹⁹ As shown below, the refinery will need to replace its current crude feedstock in order to produce sufficient propane and butane to implement the project over its expected operational duration.

19. Currently changing crude feedstock, driven by declining San Joaquin Valley Pipeline (SJVP) crude inputs to the Rodeo Facility, has been established—and accepted by Phillips 66 and public agencies alike—as a driving factor in Phillips' Marine Terminal Offload Revision Project. (BAAQMD, 2012; CSLC, 1995.)²⁰ That increase in crude and gas oil throughput over the refinery's wharf is replacing declining SJVP crude deliveries, but it is limited to only 51,182 b/d. (Id.) Semi-refined oils delivered via upgrading of crude by the SMF, the only other way Rodeo gets oil feedstock, averaged ≈38,000 b/d as SMF crude throughput from 2010–2012 and could increase to 48,950 b/d, roughly the same throughput as the new wharf limit, with the proposed Throughput Increase.²¹

¹⁶ Expert report of Phyllis Fox (Fox Rail Spur Rpt-2), attached to CBE 5 Dec 2014 comments.

¹⁷ RDEIR at 3-28.

¹⁸ See Rail Spur RDEIR at 2-36 (need for project driven by declines in local crude sources).

¹⁹ See BAAQMD, 2012. *Marine Terminal Offload Limit Revision Project CEQA Initial Study* at i, 1–3, 17 (crude and gas oil offloading limit increase of 20,500 b/d to 51,182 b/d to replace equal volume of California crude via pipeline, based on CSLC 1995 EIR); and CLSC 1995 FEIR (SCH #91053082) at § 4 page S-4 (“it is assumed that sources of San Joaquin” and “Alaskan crude, will decline” and “[m]ore reliance will be placed on crude imports from foreign sources”). See also Phillips 66 Chairman and CEO Greg Garland, quoted in Thompson Reuters, *DECEMBER 13, 2012 / 01:30PM, PSX – Phillips 66 First Annual Analyst Meeting*; www.streetevents.com (“opportunity to improve performance in California is really around getting advantage crudes to the front end of the California refineries”).

²⁰ BAAQMD, 2012 and CSLC, 1995 as cited above.

²¹ See Rail Spur RDEIR at 2-35.

20. Abundant evidence that the RDEIR does not include or analyze demonstrates that declining local and regional crude production could greatly affect SMF operation.²² Total California crude production supplied to refineries statewide has declined by 43% from its peak of 1.10 million barrels per day in 1986 to 631 thousand barrels/day (Mb/d) in 2013, and California crude now supplies only 40% of statewide refinery crude input.²³ Statewide, coastal onshore production was 137 Mb/d in 1977 but only 60.3 Mb/d in 2012, indicating a gross decline of –56% and a year-on-year decline averaging –2.0%/year in this period.²⁴ State offshore production peaked in 1978 at 107 Mb/d and was 35.6 Mb/d in 2012, indicating a gross decline of –67% and a year-on-year decline averaging –3.6% per year.²⁵ In California’s San Joaquin Basin, crude production peaked in 1986 at 745 Mb/d and was 405 Mb/d in 2012, a gross decline of –46% and annual decline averaging –2.3%/y.²⁶ California federal Outer Continental Shelf (OCS) production peaked in 1995 at 197 Mb/d and was 41.1 Mb/d in 2012, a gross decline of –79% and an average year-on-year decline during this period of –8.3%/y.²⁷ Some 13 Central Coast OCS, state offshore and onshore fields are identified as the sources of crude for the SMF.²⁸ Total production from these ‘local supply’ sources was 191 Mb/d in 1995 but only 67.1 Mb/d in 2012, a gross decline of –65% and a year-on-year decline ranging from –2.8%/y since 2003 to –5.8%/y since 1995.²⁹ See Figure 1. This 2.8–5.8%/year decline is within the range found elsewhere in the state that is discussed above (2.0–8.3%/y). As Figure 1 illustrates, this 2.8–5.8%/year rate of decline could result in total production from these ‘local supply’ sources falling below the maximum capacity of the SMF to process crude within a few years, and then falling further, to a small fraction of SMF design capacity, within the expected operating life of the proposed rail spur. When its crude rate falls too far below the design specifications of its existing equipment, such as its pipelines and vacuum unit, the existing SMF cannot operate efficiently or profitably.

²² This finding also applies to the Rodeo Facility of the Phillips 66 San Francisco Refinery.

²³ Cal. Energy Comm. (http://energyalmanac.ca.gov/petroleum/statistics/crude_oil_receipts).

²⁴ U.S. Energy Information Admin. (http://www.eia.gov/dnav/pet/pet_crd_pres_dcu_rcac_a.htm).

²⁵ U.S. EIA (http://www.eia.gov/dnav/pet/pet_crd_pres_dcu_rcasf_a.htm).

²⁶ U.S. EIA (http://www.eia.gov/dnav/pet/pet_crd_pres_dcu_rcaj_a.htm).

²⁷ U.S. EIA (<http://tonto.eia.gov/dnav/pet/hist/LeafHandler.ashx?PET&s=RCRR10R5F+1&f=A>).

²⁸ The Pt. Pedernales, Pt. Arguello, Santa Ynez, Elwood S. Offshore, Arroyo Grande, San Ardo, Cat Canyon, Orcutt, Santa Maria Valley, Lompoc, Casmalia, McCool Ranch, and Zaca fields. Further, a pipeline system connected only to local oil fields “is currently the only way that the Phillips 66 [SMF] can receive crude oil.” See Rail Spur RDEIR at 2-35.

²⁹ Data from State Division of Oil, Gas, & Geothermal Resources (DOGGR) and US DOI Bureau of Safety and Environmental Enforcement (BSEE). See Exhibit 1 Appended hereto.

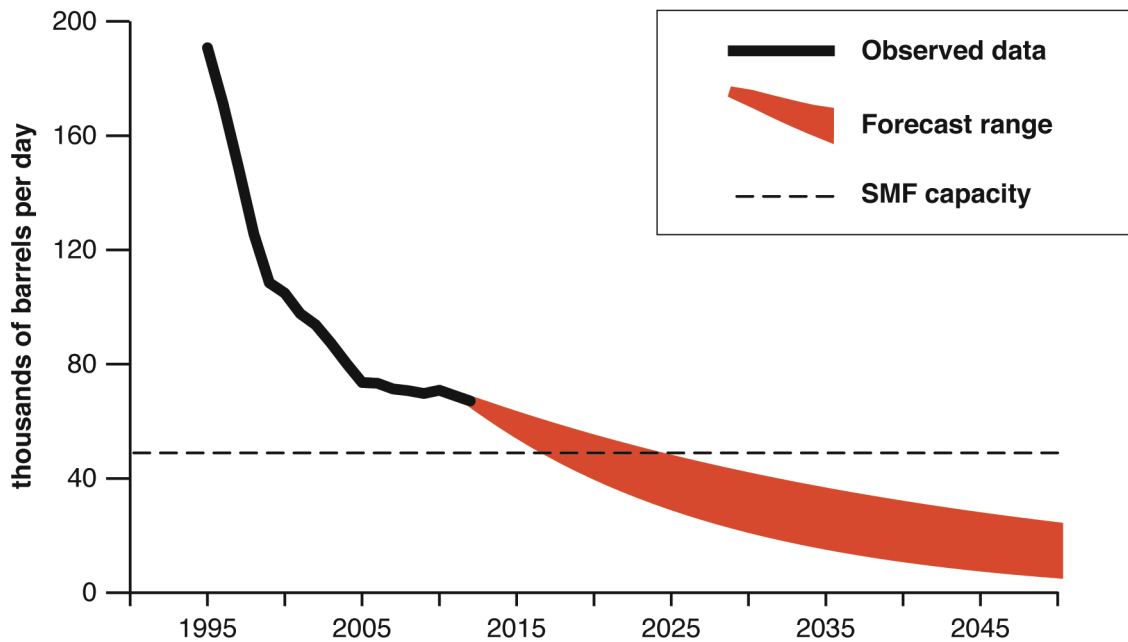


Figure 1. Total Central Coast OCS, offshore, and onshore oil production of fields supplying crude oil to the Phillips 66 SMF from 1995–2012, and forecast to 2050.

Observed production by year, in thousands of barrels per day (Mb/d)

1995	191 Mb/d	2001	97.7 Mb/d	2007	71.3 Mb/d
1996	171 Mb/d	2002	93.8 Mb/d	2008	70.7 Mb/d
1997	149 Mb/d	2003	87.3 Mb/d	2009	69.7 Mb/d
1998	126 Mb/d	2004	80.2 Mb/d	2010	70.9 Mb/d
1999	108 Mb/d	2005	73.6 Mb/d	2011	69.0 Mb/d
2000	105 Mb/d	2006	73.3 Mb/d	2012	67.1 Mb/d

Data from Cal. Dept. of Conservation (DOGGR) and U.S. Dept. of Interior (BSEE); see Exhibit 1 for details. Oil fields included are Pt. Pedernales, Pt. Arguello, Santa Ynez, Elwood S. Offshore, Arroyo Grande, San Ardo, Cat Canyon, Orcutt, Santa Maria Valley, Lompoc, Casmalia, McCool Ranch, and Zaca.

Forecast range based on range of average year-on-year decline rates (2.8–5.8%/yr) from a more recent (2003–2012) and longer (1995–2012) period, after CEC method (see CEC-600-2010-002-SF at 138).

SMF capacity is Santa Maria Facility throughput proposed (48.95 Mb/d) from Rail Spur RDEIR at 2-35.

21. If built as proposed the project would be expected to have a useful operational duration of 30–50 years (until 2045–2065).³⁰ As shown in paragraph 20 and Figure 1, current crude sources supplying project feedstock would dwindle during this period.

³⁰ See Karras Rodeo Report-1 at paragraph 11. This estimate is consistent with those for similar refining equipment made in other CEQA reviews (Id.) and with San Luis Obispo County’s estimate (Rail Spur RDEIR at 2-36). The RDEIR omits this crucial information about the project, but “amortizes construction emissions over a 30-year project lifetime” (RDEIR at 4.5-9).

22. As stated, available evidence indicates insufficient currently recoverable LPG, and even the RDEIR's unsupported overestimate of currently recoverable LPG is smaller than the project's design capacity. Processing the same oil feedstocks in smaller amounts will yield even less LPG. Thus, even if the RDEIR's unsupported overestimate is assumed—and even if the SMF does not shut down when its crude supply dwindles to a small fraction of its capacity—in the absence of a new crude source to replace dwindling current supplies from the SMF and SJVP during its operating life, the project could not be implemented as proposed.

23. Phillips' crude by rail proposal at the SMF would deliver ≈52,000 barrels per unit train and unload each train in ≈11.5 hours, so it could amply supply the new imported crude oil for the proposed throughput increase to 48.95 Mb/d.³¹ Further, this proposal's asserted exclusion of Bakken crude, heated unloading equipment, weight limits on rail tanker car crude volume, and asserted crude sources,³² together with the predominance of the tar sands among available crude sources of this type indicate that tar sands oil would most likely dominate the new crude feedstock enabled by the project. This would be a dramatic change in refinery feedstock: Tar sands bitumen is *fundamentally* different from heavy oil or conventional crude.³³

24. In sum, Phillips' proposal to recover additional LPG from its crude feedstock is inextricably related to its proposal to replace currently dwindling crude feedstock with new feedstock that most likely will be dominated by fundamentally different bitumen-derived 'tar sands' oils. My previous comments found the reasonable potential that this project-related feedstock switch could result in significant potential catastrophic hazard, air quality, public health, and climate impacts.³⁴ Instead of addressing these potential impacts the RDEIR asserts the unsupported and erroneous conclusion that the project "has no connection to" the crude switch.³⁵ Therefore, its failure to disclose, describe, analyze and address this project-related change in oil feedstock and its environmental implications represents a fundamental flaw in the RDEIR.

³¹ See Rail Spur RDEIR at 2-22, 2-29 and 2-35.

³² Rail Spur RDEIR at 2-1, 2-14, 2-15, 2-22 and 2-33.

³³ See Meyer et al., USGS Open-File Report 2007-1084 (<http://pubs.usgs.gov/of/2007/>) at 2.

³⁴ Karras Rodeo Report-1 at paragraphs 56–83.

³⁵ See paragraphs 13–23; see also FEIR at 3.2-130, response to comment that undisclosed changes in crude oils processed could create undisclosed environmental impacts: ("The DEIR did not address changes in crude oil use because ... the objectives of this Project would be achieved irrespective of crude oil feedstock selection."). (Emphasis added.)

Project Scope

25. Phillips' Santa Maria and Rodeo facilities (SMF and RF, respectively) are interdependent parts of its San Francisco Refinery (SFR), and its SMF rail spur, SMF throughput increase, and RF LPG³⁶ proposals are interdependent parts of a larger project that has been piecemealed,³⁷ as shown below.

26. SFR is identified and reported as a single oil refinery comprised of the SMF and RF by government and industry authorities,³⁸ by San Luis Obispo County,³⁹ and by Phillips itself (see Phillips 66 website).⁴⁰ SFR's primary, and from Phillips' perspective essential, products are gasoline, diesel and jet fuel. (*Id.*) But the SMF does not make *any* finished gasoline, diesel, or jet fuel by itself, and lacks the hydroprocessing and naphtha reforming capacity necessary to do so—all of the SFR hydrocracking, hydrotreating, hydrogen production, and naphtha reforming capacity is at the RF.⁴¹ Instead, Phillips 66 sends all of the partially upgraded feedstock that the SMF produces (gas oil and naphtha-pressure distillate) through a proprietary pipeline to the RF, where all of the SFR's finished gasoline, diesel and jet fuel is made and then shipped from the RF product pipelines and wharf for sales.⁴² The SMF thus depends upon the RF for transport fuel production and financially sustainable operation.

27. The RF, in turn, relies on the SMF for sufficient feedstock delivery and deep conversion (coking) capacity. San Joaquin Valley Pipeline (SJVP) crude delivery to the RF is declining with declining San Joaquin Basin production (see paragraphs 19–20), and this decline has already driven a throughput increase at the RF wharf (BAAQMD,

³⁶ 'Propane Recovery' proposal; SCH #2012072046; this RDEIR.

³⁷ These points are made in my expert report submitted to San Luis Obispo County as well.

³⁸ Compare refinery capacity reports by EIA (<http://www.eia.gov/petroleum/refinerycapacity/>) and *Oil & Gas Journal* (<http://www.ogi.com/ogi-survey-downloads.html#worldref>) to facility configuration and throughput reports by State Regional Water Quality Control board permits (Order R3-2013-0028 at Table F-9 and Order R2-2010-0027 at Table F-1C); see also Rail Spur RDEIR at 2-32; Throughput Increase FEIR at 2-12; and RDEIR at 3-10 through 3-19.

³⁹ See Rail Spur RDEIR at 2-4; Throughput Increase FEIR at 2-1. Notably, the RDEIR's only references to the SFR are in its reference titles and a footnote on page 1-3 regarding changes of ownership: it fails to disclose that the RF is a component of a single, larger refinery, the SFR.

⁴⁰ www.phillips66.com/EN/about/our-businesses/refining-marketing/refining/Pages/index.aspx

⁴¹ Compare refinery capacity reports and facility-level orders and EIRs cited in the note above.

⁴² See Rail Spur RDEIR at 2-4 and the Throughput Increase FEIR at 2-1; see also the product export facilities discussion in the RDEIR at 3-18. The SMF was sited on the Central Coast to tap local crude sources there. This, together with San Francisco Bay/Delta tanker port capacity afforded to the RF, helps explain the SFR's geographically unusual design.

2012).⁴³ Even with this new wharf capacity, however, oil delivery across the wharf is limited to only 51.2 Mb/d. (*Id.*) Crude delivery and upgrading via the SMF—the only other way the SFR receives crude—is a substantial portion (≈ 38.0 Mb/d⁴⁴) of its total crude supply. All SFR crude input is necessarily finished at the RF to make a financially sustainable product slate (*see* paragraph 26), so the SFR, and thus the RF, needs this SMF-derived crude. Moreover, roughly half of the coking capacity utilized by the SFR currently is at the SMF.⁴⁵ The RF needs this additional deep conversion capacity at SMF to feed its hydrocrackers sufficient heavy gas oil for the SFR to convert its crude slate into gasoline, diesel, and jet fuel efficiently and, from Phillips’ standpoint, economically. Indeed, the new heavy gas oil hydrocracker at the RF that is fed this SMF gas oil⁴⁶ was built for exactly that purpose,⁴⁷ and could become a stranded asset without that feed.

28. Similarly, the SMF relies on existing infrastructure for feedstock. The SMF relies on a pipeline system fed by declining local crude supplies that cannot maintain its current crude rate for long, much less sustain a crude rate increase of $\approx 29\%$ to 48.95 Mb/d, the proposed throughput increase—but the rail proposal could do so. (Paragraphs 20–23.)⁴⁸ In the absence of a new port, interstate pipeline, long-distance trucking plan, or any other credible proposal for sustained delivery of sufficient imported crude to implement this project component, the proposed throughput increase is dependent upon the rail spur.

29. A third component of the piecemealed project involves propane and butane, which are liquefied petroleum gases (LPG).⁴⁹ LPG is in refiners’ hydrocarbon streams because it distills out from oil feeds, and because it is created in coking, hydrocracking, and other refining processes that ‘crack’ (break apart) larger, denser, or higher boiling-point hydrocarbons in the oil feeds. LPG is burned as refinery fuel, recovered, or both. Not all LPG present in all refinery hydrocarbon streams is recoverable with currently

⁴³ *See* BAAQMD, 2012. *Marine Terminal Offload Limit Revision Project CEQA Initial Study* at i, 1–3, 17 (crude and gas oil offloading limit increase of 20,500 b/d to 51,182 b/d to replace equal volume California crude via pipeline, based on CSLC 1995 EIR); and CLSC 1995 FEIR (SCH #91053082) at Section 4 page S-4 (“it is assumed that sources of San Joaquin” and “Alaskan crude, will decline” and “[m]ore reliance will be placed on crude imports from foreign sources”).

⁴⁴ From 37,785 b/d (2010), 38,701 b/d (2011), and 37,602 b/d (2012); Rail Spur RDEIR at 2-35.

⁴⁵ From 23,200 b/d (Order R3-2013-0028 Table F-9) v. 47,000–48,000 b/cd (*Oil & Gas J.*; EIA).

⁴⁶ *See* RDEIR at 3-10 through 3-12.

⁴⁷ *See* ‘Clean Fuels Expansion’ Nov. 2006 Prelim. EIR SCH #2005092028 at 3-1, 3-18, 3-22/23.

⁴⁸ *See* also Rail Spur RDEIR at 2-35 (pipeline system from local oil fields “is currently the only way that the Phillips 66 [SMF] can receive crude oil”).

⁴⁹ Herein, ‘LPG’ means propane and butane, the only gases Phillips proposes to recover.

available technology. Propane and butane that is recovered can be sold as fuel or as petrochemical feedstock, and butane can be blended into winter gasoline. As stated, Phillips 66 proposes to recover propane and additional butane at its RF. It proposes to install a hydrotreater, recovery columns, pressure storage bullets, and a rail loading spur and rack, and—decades after other refiners stopped exploiting the San Francisco Bay/Delta in this way—would expand Phillips’ once-through cooling system. The three components of the project are in review or await final approval before Contra Costa County or San Luis Obispo County and none of them has been implemented.

30. The publicly verifiable data in the record indicate that insufficient propane and butane is recoverable in the project baseline to implement Phillips’ LPG proposal without the additional cracking process feedstock, additional LPG-rich naphtha/pressure distillate, or both, that its SMF throughput increase and rail spur could supply. My past comments, and those of others, raised and documented this finding. Unfortunately, instead of reporting and analyzing publicly verifiable data on current and potential sources of recoverable LPG, the counties’ environmental reviews, thus far, have dismissed those comments with unsupported and contradictory assertions. (See paragraph 16.)

31. The new argument that vapor pressure limits do not allow any more LPG to be sent from the SMF to Rodeo⁵⁰ is totally unsupported by any data in the RDEIR, improbable, and shown by data the RDEIR omits to be erroneous. (See paragraph 17.) This ‘vapor pressure’ argument also ignores, and thereby distracts from a crucial point: LPG feedstock sent to Rodeo not as LPG, but as gas oils and pressure distillate (naphtha), yields substantial amounts of recoverable LPG from processing at Rodeo. Ignoring this link between the facilities’ project components would be a fatal error.

32. Some of the volumetric implications for RF hydrocracking and reforming of gas oil and naphtha in a ‘SMF projects’ scenario, in which the rail and throughput proposals are implemented, and in a ‘No SMF projects’ scenario, in which those proposals are not implemented, are summarized in Table 1. Gas oil and naphtha/pressure distillate are the major SMF exports to the RF. Gas oils are hydrocracked at the RF to make gasoline, diesel, and jet fuel sized hydrocarbon molecules with high enough hydrogen:carbon ratios

⁵⁰ RDEIR at 3-25, 2-36. *See also Response to Appeals by the Rodeo Citizens Association and Communities for a Better Environment*; letter from Mark E. Evans, Phillips 66 San Francisco Refinery Manager, to Chair Karen Mitchoff and Members of the Contra Costa County Board of Supervisors. 6 January 2014; and Rail Spur RDEIR at 2-31.

Table 1. Estimated oil feedstock effects at the refinery's Rodeo Facility in 'project' and no project' scenarios for the Santa Maria crude by rail and throughput increase.

****Figures EXCLUDE additional LPG-boosting effects of tar sands 'dilbit' processing****

Data in thousands of barrels/day (Mb/d), and percent

	Current conditions	Santa Maria Project Component Scenarios	
		SMF projects	No SMF projects
Santa Maria Facility			
crude throughput (Mb/d)	38.00	48.95	17.82
Δ vs. current (%)	—	29%	-53%
naphtha to Rodeo (Mb/d)	11.63	15.00	5.45
% Δ vs. current	—	29%	-53%
gas oil to Rodeo (Mb/d)	20.71	26.68	9.71
% Δ vs. current	—	29%	-53%
Rodeo Facility			
hydrocracking			
capacity (Mb/d)	58.00	58.00	58.00
feed rate (Mb/d)	51.75	57.72	40.75
utilization rate (%)	89%	99%	70%
Δ in feed rate (%)	—	11%	-21%
naphtha reforming			
capacity (Mb/d)	31.00	31.00	31.00
feed rate (Mb/d)	29.40	32.77	23.22
utilization rate (%)	95%	106%	75%
Δ in feed rate (%)	—	11%	-21%

Current crude rate is the 2010–2012 avg. of data from Rail Spur RDEIR at 2-35; SMF projects crude rate is the proposed Throughput Increase. (Id.) 'No SMF projects' crude rate is from the median year-2045 forecast illustrated in Figure 1 and the conservative assumption that all crude produced by Central Coast OCS, state offshore and onshore oil fields now identified as SMF suppliers will be supplied to the SMF (other plants received 45% of total production from these oil fields during 2010–2012). SMF naphtha and gas oil supplied to Rodeo are throughputs reported by the SLOAPCD emission inventory, for all SMF plant naphtha and gas oil product tanks. This SLOAPCD data appear reasonable based on design performance and measurements of similar processes and crude slates as those at the SMF. Rodeo 2014 capacities in b/cd from USEIA (<http://www.eia.gov/petroleum/data.cfm>); Rodeo feed rates are multi-year averages from SFRWQB NPDES Order R2-2011-0027. Scenario feed rates are based on changes in gas oil (HCU) or naphtha (CRU) feed rate.

** Effects of LPG-rich diluents and harder-to-crack bitumen in tar sands dilbits (not shown in the table) would greatly boost LPG-per-barrel processed in the 'SMF projects' scenario.

for these high-value products—and yield significant amounts of propane and butane in this process. The gasoline stream (naphtha) must also be 'reformed' to boost octane rating, and thus is processed via catalytic naphtha reforming at the RF. The table shows changes from current (2010–2012) conditions in both scenarios identified above.

33. As stated, available evidence indicates insufficient currently recoverable LPG, and estimates based on publicly verifiable data for LPG known to be recoverable with available technology indicate that roughly half of Phillip's proposed LPG recovery capacity would be idle in these 'baseline' conditions. (See Paragraph 16.) Implementing the SMF throughput increase and rail components, however, would boost its naphtha and gas oil deliveries to Rodeo by $\approx 29\%$ and boost *total* RF gas oil hydrocracking by $\approx 11\%$. See Table 1. Because hydrocracking is a significant LPG producer, LPG available for recovery at the RF would increase proportionately more than this 11%. Recoverable LPG would increase still more from the additional coking (not shown) of 29% more crude feed and, given that tar sands dilbits are the most likely new crude feed, from the LPG-rich diluents in these dilbits. (See Fox comments.) The sum of these increments could boost recoverable LPG at Rodeo from roughly 50% to more than 70% of the proposed project's design capacity.

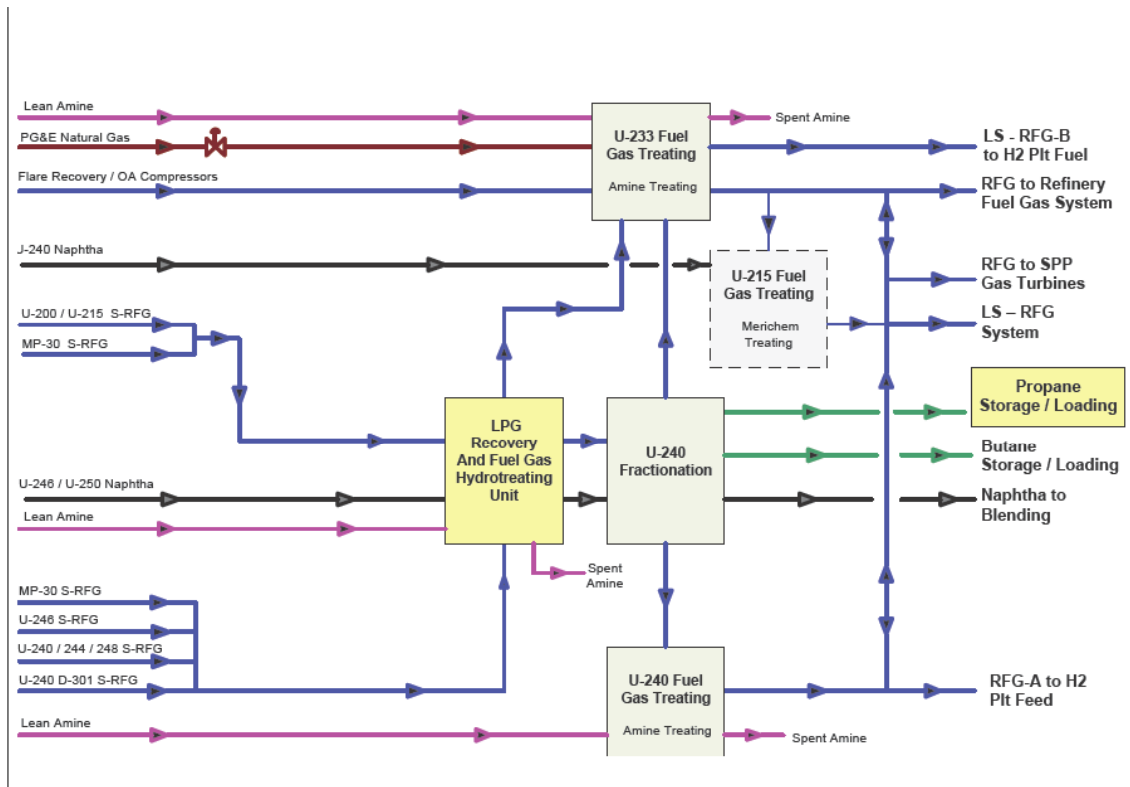
34. In the 'No SMF projects' scenario, SMF crude throughput would rely on terminally declining local/regional crude supplies and would decline as illustrated in Figure 1. A conservative (less steep) estimate of this decline and its effects on processing is described in Table 1 (see caption), for the time frame roughly around 2045, which is within the project duration (see paragraph 21). SMF-to-RF naphtha and gas oil volumes drop by about half and *total* RF gas oil hydrocracking drops by $\approx 21\%$. This is a conservative estimate; if it does not replace its already-declining crude feedstock supply by then, the SMF might more likely be shut down by 2045. (See Figure 1.)

35. The RDEIR's revised estimate of currently recoverable LPG suggests a small shortfall below the project design basis, ranging from 10–31% of project capacity being idled, depending upon the averaging period chosen. (See Paragraph 16.) This estimate is not supported by publicly verifiable data and overestimates recoverable LPG by applying maximum conditions as average ones and including LPG streams that are not feasible to recover in its 'recoverable' estimate. (Id.) Even if the RDEIR's overestimate is assumed, however, the 21% reduction in gas oil hydrocracking in the 'No SMF projects' scenario and the further LPG supply losses from idled coking and distillation capacity at the SMF could reduce LPG at the RF enough to idle roughly 40–50% of the proposed project capacity. Thus, the project cannot be implemented as proposed in the 'No SMF projects' scenario. Therefore, the Rodeo LPG component of the project depends upon the SMF throughput increase and crude by rail components for feedstock.

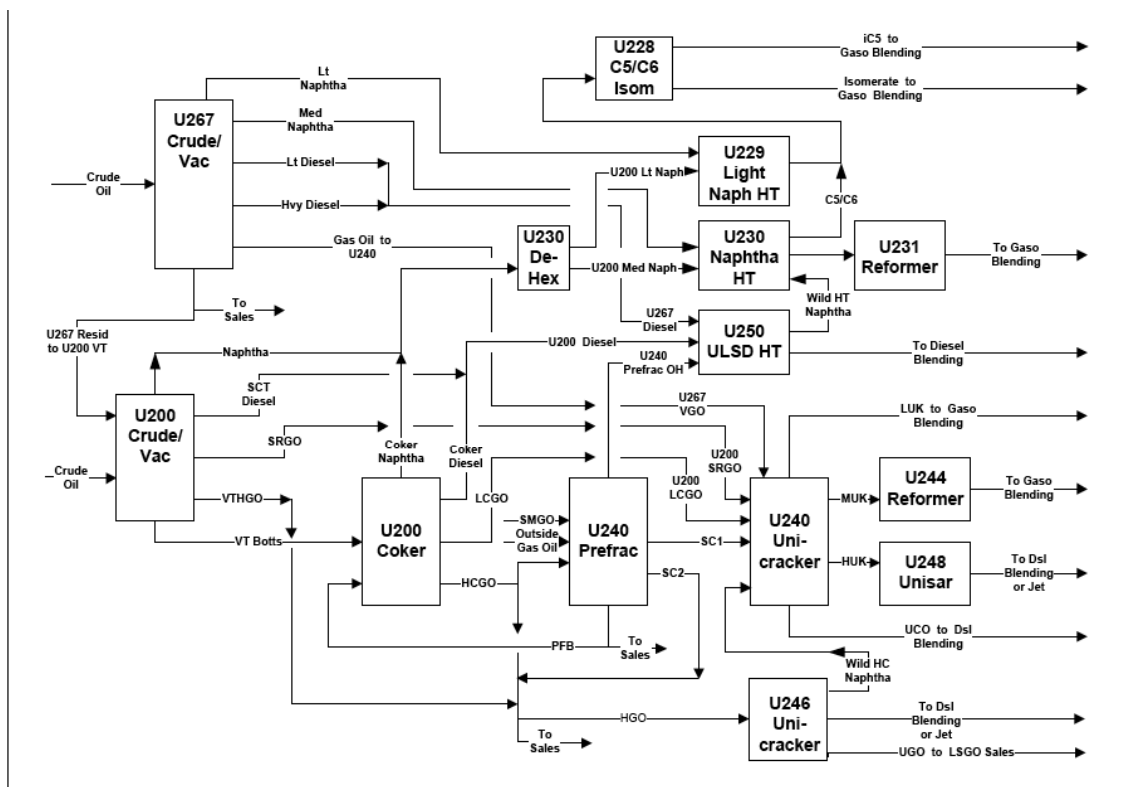
36. Importantly, an otherwise unexplained change in the project description is informed by the ‘current conditions’ and ‘SMF project’ results for naphtha in Table 1. Naphtha from the Rodeo heavy gas oil hydrocracker (Unit 246) and the ULSD diesel hydrotreater (U250) is routed through the proposed new ‘fuel gas’ hydrotreater in Revised Figure 3-6 of the RDEIR. These streams were routed through the proposed LPG recovery but *not* the proposed new hydrotreater in Figure 3-6 of the June 2013 DEIR. Further, these U246 and U250 streams are ‘wild naphtha’ derived at least in part from processing the SMF gas oil (‘SMGO;’ see Figure 3-4.⁵¹) Finally, these wild naphtha streams are now fed through other processes to reforming units U231 and U244 (see Figure 3-4), but revised Figure 3-6 shows the project re-routing them to naphtha blending instead. In sum, these naphtha streams are fed to the Rodeo reformers now but the revised LPG recovery proposal would instead route them through the new hydrotreater. For convenient review, RDEIR Revised Figure 3-6, RDEIR Figure 3-4, and original Figure 3-6 from the June 2013 DEIR are excerpted below.

37. The ‘current conditions’ and ‘SMR projects’ results for naphtha reforming in Table 1 are relevant to this project revision because they show that the Rodeo reformers are currently near maximum capacity (95% of 31.0 Mb/d) and would violate this maximum capacity limit if the SMF project components are fully implemented (106% of capacity). Further, the estimate in Table 1 probably underestimates this problem by conservatively assuming none of the expected further increase in naphtha inputs from the diluent in tar sands dilbits, though the throughput increase cannot be implemented without the rail spur, which would most likely tap these price-discounted and LPG-rich oil feeds. In any case, the units probably could not run properly, efficiently *and* safely if run beyond maximum capacity on a sustained basis, and either selling low-value unfinished naphtha into the new shale oil-dominated crude market at a deep discount, or cutting crude rate because of this limitation, could be costly. It also would mean that the throughput increase project could not be fully implemented. Routing some of the naphtha from the SMF to the new hydrotreater instead would relieve the bottleneck while allowing those streams to be part of the finished product slate—and that is what the LPG project revision described in paragraph 36 would do. Thus, the LPG component of the project enables full implementation of the SMF components.

⁵¹ See also the comments of Phyllis Fox regarding the ‘Propane Recovery’ DEIR.



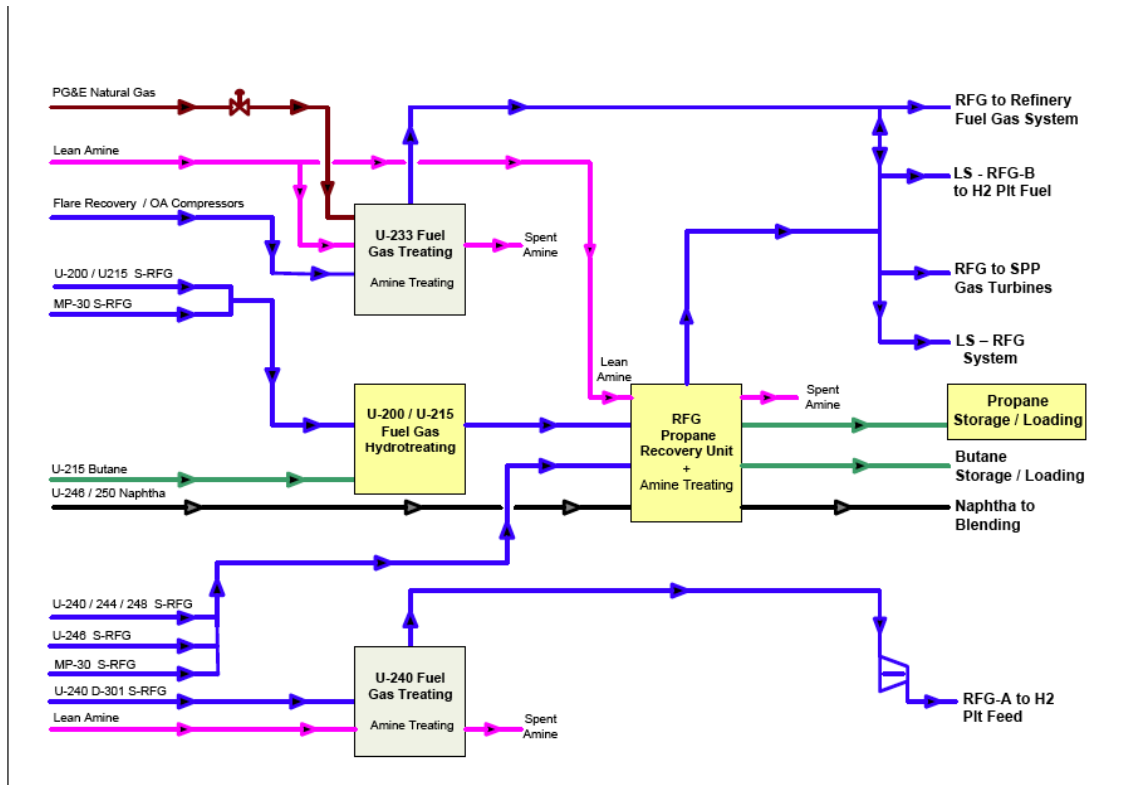
SOURCE: Phillips 66 Company
 Phillips 66 Propane Recovery Project . 120546
Figure 3-6 Revised
 Proposed Refinery Fuel Gas System Block Flow Diagram



SOURCE: Phillips 66 Company

Phillips 66 Propane Recovery Project . 120546

Figure 3-4
Overall Block Flow Diagram of Refinery



SOURCE: Phillips 66 Company

Phillips 66 Propane Recovery Project . 120546

Figure 3-6
 Proposed Refinery Fuel Gas System Block Flow Diagram

38. As discussed in paragraphs 25–37, the San Francisco Refinery’s proposed ‘projects’ in Santa Maria and Rodeo are inextricably interrelated. The Santa Maria throughput increase is dependent upon the crude by rail proposal, the Rodeo LPG recovery/hydrotreater proposal is dependent upon those Santa Maria components, and those throughput increase and crude by rail components are dependent upon the new Rodeo hydrotreater for full project implementation. Therefore, the crude throughput rate increase, crude by rail, and LPG recovery proposals are interdependent parts of a single project of larger scope that has been piecemealed.

39. The failure to evaluate this project as a whole results in underestimating the scope and severity of identified impacts. The greater climate-disrupting emissions, toxic air contaminant emissions, smog-forming emissions, and safety hazards of project crude oil trains to the SMF *and* LPG trains from Rodeo, in combination and on many of the same routes, are examples of this underestimation. It further results in failure to identify some impacts at all, such as the toxic, smog-forming, and climate-disrupting emissions from refining larger volumes of crude feedstock, and those from switching to processing of bitumen oils. These ‘tar sands’ oils are extremely dense, refractory and contaminated and require substantially more energy, and fuel combustion for that energy, per barrel refined, thereby greatly boosting refinery emissions intensity and process safety hazard.⁵² Equally important, evaluating the project only one piece at a time results in failure to identify feasible means to lessen or avoid impacts. For example, the switch to tar sands oil that is clear when the project is viewed as a whole would result in significant potential impacts from *refining* (in addition to the project’s significant potential impacts along the mainline rails). Thus, the County clearly *can*—and indeed, *should*—consider choosing to demand that Phillips 66 refrain from the most dangerous and polluting type of oil known. But the RDEIR mentions no such mitigation. In short, the piecemealing of this project is a fundamental flaw in the RDEIR.

⁵² My previous comments found the reasonable potential that this project-related feedstock switch could result in significant potential catastrophic hazard, air quality, public health, and climate impacts. (Karras Rodeo Report-1 at paragraphs 56–83.)

Project Impacts

40. All of the potential impacts associated with the changes in oil feedstock at the SFR's SMF and RF and the changes in the oil and LPG rail transport to and from these facilities that are identified in my comments⁵³ and those of Dr. Fox are also cumulative impacts of Phillips' throughput increase, crude by rail, and LPG recovery proposals. The RDEIR's failure to disclose, evaluate, or mitigate these potential impacts is unsupported and inappropriate, as discussed in paragraphs 12–39.

41. CBE learned of Kinder Morgan's new crude by rail terminal in Richmond following my previous comments in this matter. This terminal is adjacent to the Port of Richmond and aligned with rail routes that the project would be expected to use for LPG transport from the RF and crude transport to the SMF.⁵⁴ A map of the mainline routes from Roseville through Rodeo, Richmond and other Bay Area communities on the way toward the SMF is excerpted from the Rail Spur RDEIR below. The RDEIR does not include this terminal in its cumulative impact analysis,⁵⁵ does not say whether crude delivered by rail to the SMF might be loaded at this terminal, Richmond's port, or both, and does not appear to mention the Kinder Morgan crude by rail terminal at all.⁵⁶

42. Phillips' proposal and route for diluted bitumen by rail to the project are now revealed more clearly. (See paragraphs 19–23; Rail Spur RDEIR at 4.13-9.) Bitumen poses a different and more severe spill hazard for water quality and aquatic life than conventional crude. It is denser than water and sinks to the bottom when spilled into water. Aquatic remediation by surface skimming does not work on these tar sands oil spills; they are effectively impossible to 'clean up,' worsening aquatic spill impacts. Compounding the hazard, the project would bring crude oil trains through the unique aquatic habitats of the San Francisco Bay/Delta. (See map, next page.) There is a reasonable potential that this could result in significant impacts to Bay/Delta ecosystems from tar sands oil spills in derailments of project-bound crude oil trains. The RDEIR does not disclose or address these potential impacts of the project on the Bay/Delta.

⁵³ My previous comments found the reasonable potential that these project-related changes in oil feedstock could result in significant potential catastrophic hazard, air quality, public health, and climate impacts. (Karras Rodeo Report-1 at paragraphs 56–83.)

⁵⁴ See RDEIR at 4.3-9 and 4.3-10; Rail Spur RDEIR at 4.13-9.

⁵⁵ See RDEIR Table 5-1.

⁵⁶ A search of the RDEIR on "Kinder Morgan" returned a "no matches were found" result.

43. Garbage in—garbage out errors continue to plague the Health Risk Assessment (HRA) in the RDEIR. In one example that is a fatal flaw in the HRA by itself, the emissions estimates used in the HRA drastically underestimate potential emissions associated with the project. Failing to disclose and analyze emissions associated with the project-related change in crude feedstock discussed in paragraphs 12–40, the RDEIR excludes those emissions from its estimate, drastically underestimating the project’s emission potential for multiple pollutants. Using those erroneously lower emissions estimates as inputs to the HRA forces the health impact results calculated for those emissions by the HRA to be erroneously less severe than the true project potential.

44. Interpretative problems still plague the HRA in the RDEIR as well. For example, despite the drastic underestimation discussed in paragraph 43, the RDEIR reports a per-million people cumulative cancer risk from exposures to toxic air contaminants for the project of $\approx 61/\text{MM}$. (RDEIR at 4.1-34.) Impact screening thresholds for such general population involuntary exposures have generally ranged widely, from $1/\text{MM}$ to $100/\text{MM}$, with most air districts in California using $10/\text{MM}$ to $20/\text{MM}$. Also, the Air District using $100/\text{MM}$ has publicly disavowed this outlier threshold as potentially under-protective.⁵⁷ The RDEIR, however, picks the $100/\text{MM}$ threshold without mentioning all of the more health-protective ones or that its choice has been disavowed, and concludes on that basis that the impact is ‘less than significant.’ (RDEIR at 4.1-14, 4.1-31, 4.1-34.) A more reasonable interpretation would reject the disavowed outlier in favor of a less extreme threshold, and note that the $61/\text{MM}$ HRA result exceeds it, indicating that the project has the reasonable potential to contribute to a significant cumulative air toxics impact.

45. The RDEIR’s revised analysis of greenhouse gas (GHG) emissions fails to explain how—if offsite emissions from the project’s LPG sales are too speculative to estimate as it claims—it can estimate them at a level of zero, particularly when this transforms a significant impact finding into a less-than-significant finding. (RDEIR at 4.5-13/14/15.)⁵⁸ This issue was addressed in my previous comments. An emission range

⁵⁷ See Staff presentations to the BAAQMD Board regarding the Petroleum Refinery Emissions Tracking Rule and Office of Health Hazard Assessment Update, Oct–Nov 2014.

⁵⁸ The RDEIR’s estimate of zero metric tons per year emitted from the propane and butane sold and portion of that burned offsite is mathematically incontrovertible. See table on page 4.5-15: Subtracting the emissions caused by burning all of this LPG onsite ($708,858 \text{ Mt/y}$) from those caused by burning the natural gas replacing that LPG onsite ($592,792 \text{ Mt/y}$) yields a difference of $-116,066 \text{ Mt/y}$, which is equal to the table’s “net fuel source transfer combustion emissions.” This equivalence (zero difference) proves the RDEIR estimates 0 Mt/y offsite LPG emissions.

could be estimated, and any credible estimate of offsite emissions from project sales of these LPG fuels must admit at least 10% of them could potentially be burned, which would reveal a significant impact. (See RDEIR Table 4.5-3.)

46. A project revision that appears to broaden the uses of the proposed expansion of once-through cooling (OTC)⁵⁹ emphasizes the point that this OTC expansion would be oversized for the project heat sources disclosed, and the question of whether that excess capacity is needed for heat from processing the project's changing oil feedstock. My previous comments raised this point and question.⁶⁰ The RDEIR's admission that the OTC expansion would be operated to boost heat discharge in proportion to Bay cooling water flow (RDEIR at 4.7-23), and its additional project revision to route naphtha produced in part from SMF oil feeds to Rodeo (paragraphs 10, 36–38), further emphasize this point and question. But the RDEIR continues the DEIR's failure to disclose the sources of this excess heat and their contributions to the excess, even as it changes the project description to broaden and further obscure this part of the project description.

47. My previous comments found that the DEIR underestimated project OTC impacts substantially by overestimating current average flow based on the erroneous assumption that a single recent year accurately represents current conditions, and provided detailed data supporting those findings. (Attachments 1 and 2.) I also noted that past monitoring of environmental conditions at lower OTC flow does not by itself predict impacts of the much greater proposed cooling water and heat flows. (*Id.*) Unfortunately, the RDEIR's revised discussion reasserts the same inflated OTC baseline and erroneous claim that a single recent year accurately represents current average conditions, fails to include any actual data supporting those assertions, and still relies on monitoring of past Bay conditions at lower OTC flows to predict project impacts.⁶¹ The publicly verifiable data in the record (which the RDEIR thus ignores) indicate that instead of the 25% increase suggested by its inflated baseline, the project could increase OTC flow by 40–65%. (See Attachment 2.)

⁵⁹ RDEIR at 3-37 vs. DEIR at 3-27; *see* also Paragraph 11.

⁶⁰ Attachment 1 at paragraphs 27–30.

⁶¹ RDEIR at 4.2-27 through 4.2-29, 4.7-22 and 4.7-23. *See* esp. 4.7-22 (baseline assertions) and 4.2-29 and 4.7-23 (reliance on past monitoring). *See* also 4.2-29 (the size and dispersal of the impact plume is “primarily driven by tides and output temperature and volume [*emphasis added*]”) and 4.2-27 (RDEIR analysis excludes impacts associated with effects on eggs and larvae of aquatic species that are not already listed as threatened or endangered).

48. The RDEIR's revised OTC discussion also asserts: "In 2005, the Refinery became the first company in California to successfully operate a wedgewire screened intake in a saltwater environment." (RDEIR at 4.2-28.) Strangely, the RDEIR omits mention of a more salient singularity: Phillips 66 is the only refiner that still exploits the San Francisco Bay/Delta by using once-through cooling.⁶² The omission truncates the RDEIR's evaluation, obscuring facts about the environmental setting that would reveal additional impacts from the proposal to extend the operating duration of this antiquated technology and the feasibility of avoiding OTC impacts entirely as other refiners have done already. Moreover, the revelation that by extending OTC operation the project would cause impacts from the entire OTC flow exposes the fallacy of the argument that replacing OTC has no nexus to the project,⁶³ and further shows that the RDEIR's failure to analyze this alternative is unreasonable.

49. CBE has learned that, following my previous comments in this matter and the County's request for "Inherently Safer System study for the new process including storage and loading operations that includes the evaluation of alternatives listed in the Draft EIR"⁶⁴ Phillips 66 did perform that Inherently Safer System (ISS) analysis.⁶⁵ Crucially, the County's request for ISS analysis including "alternatives listed in the Draft EIR" referred to cooled storage—which may be inherently safer than the pressurized storage of LPG proposed, with respect to the specific hazard of catastrophic explosion (BLEVE). Proper ISS analysis would be based on Process Hazards Analysis (PHA), the rigorous analysis of process systems upon which current industrial safety practice relies, and ISS is an indispensable layer of protection that is higher in the hierarchy of safety controls, reflecting its importance. (See Chemical Safety Board, 2013.)⁶⁶ Thus, project-

⁶² See Attachment 1 at paragraphs 31 and 32. The two points are related: the intake screens were installed at the refinery *instead of* replacing OTC and even after this half measure was installed water quality officials required Phillips to investigate replacing OTC at Rodeo. (*Id.*)

⁶³ See RDEIR at 6-6 (closed loop cooling alternative to OTC not analyzed in RDEIR; analysis of alternative to OTC "for the Project's *additional cooling needs only*" [*emphasis added*]; this alternative "was not considered practical" and "was not considered further").

⁶⁴ 11 July 2013 letter from Michael Dossey, Accidental Release Prevention Engineer, Contra Costa Health Services, Hazardous Materials Programs, to Jim Ferris, Health and Safety Superintendent, Phillips 66 San Francisco Refinery, re; *Phillips 66 Propane Recovery Project* (County File #LP12-2073).

⁶⁵ Per. Comm. with Michael Kent, Hazardous Materials Ombudsman, Contra Costa County Health Services. 4 Dec 2014.

⁶⁶ U.S. Chemical Safety Board (CSB), 2013. *Interim Investigation Report: Chevron Richmond Refinery Fire; Chevron Richmond Refinery, Richmond, California, August 6, 2012.*

specific ISS analysis is essential to adequate evaluation of project hazards and the specific question of whether cooled instead of pressurized LPG storage is a safer alternative. My previous comments addressed this issue, noting the need for ISS analysis to be included in this CEQA review, and that the DEIR's concerns over costs of electricity and a new flare were misplaced, as there is no such cost exemption for otherwise feasible ISS.⁶⁷ Despite the reported availability of the ISS analysis to the County, the RDEIR still dismisses this alternative from further consideration based on exactly the same cost concerns expressed in the same words (RDEIR at 6-5 and 6-6), and it still does not include, disclose or even discuss this ISS analysis. (As CSB investigation reports demonstrate, this level of process safety detail can be released publicly without abridging confidentiality concerns.) This failure to disclose available information that is needed for an informed project decision about safety in the RDEIR appears improper.

50. Potential impacts of the change in hydrogen plant feedstock that is indicated by the RDEIR's revised project description (see Paragraph 9) are not analyzed or even discussed in the RDEIR's text. Hydrogen production is a major GHG emitter, and RF hydrogen plant process upsets, shutdowns for required maintenance, and shutdown/startup design requirements are reported in BAAQMD Rule 12-12 causal analysis reports as recurrent causal factors in environmentally significant flaring at Rodeo.

51. An old issue merits critical attention. Potential benefits from reducing sulfur dioxide emissions by half, while that is achievable and important to achieve, could be unrealized if Phillips' and BAAQMD's stated plan⁶⁸ to proceed with emission reduction credits (ERCs) for this emission cut is not addressed. ERCs are a type of 'pollution trading' that could allow Phillips to increase those emissions again. I commented previously on this problem and suggested that the "County could consider developing a land use permit condition that ensures the 50% reduction in refinery wide SO₂ emissions identified in the DEIR will be real, measurable and permanent."⁶⁹ The RDEIR proposes no such measure. The RDEIR's assertion that this ephemeral emission reduction is a benefit of the project without addressing the foreseeable plan to potentially cancel out that claimed benefit through pollution trading is inaccurate and misleading.

⁶⁷ Attachment 1 at paragraphs 39–44, 49, and 50.

⁶⁸ Air Permit Application at 17, Section 3.4 (Permit App Sections 1–3); and Per. Comm. with Jim Karas, BAAQMD at 4 Dec. 2013 Board Meeting (BAAQMD advised Phillips 66 to defer its ERC application and proceed with this step after project approval).

⁶⁹ Karras Rodeo Report-1 at paragraphs 26, 54.

Conclusions

52. Based on my knowledge, experience and expertise and the data, information and analysis discussed in this report, in my opinion:

- Project-related changes in San Francisco Refinery (SFR) oil feedstock sources, quantity, and quality are not disclosed in the RDEIR.
- The project would enable substantial changes in SFR oil feedstock sources, quantity, and quality and would most likely shift the SFR to refining fundamentally different ‘tar sands’ oils.
- The description of the project scope in the RDEIR is truncated, inaccurate, and misleading.
- Proposed LPG recovery and hydrotreating at the Rodeo Facility, crude throughput increase at the Santa Maria Facility, and crude by rail unloading at the Santa Maria Facility are inextricably related, interdependent components of a single project of larger scope that has been piecemealed.
- The project as revised in the RDEIR still has the reasonable potential to cause the significant adverse hazard, air pollution, public health, aquatic habitat destruction, and climate impacts identified in my prior comments in this matter, and the RDEIR does not identify, mitigate, or otherwise address adequately these significant potential impacts.
- The project has the reasonable potential to result in significant impacts that the RDEIR does not identify, mitigate, or otherwise address from oil spills in derailments resulting from project crude oil transport by rail across the San Francisco Bay/Delta.
- The project has the reasonable potential to contribute substantially to cumulative impacts that the RDEIR does not identify, mitigate, or otherwise address adequately.
- The RDEIR does not include adequate information about the project to identify other potential impacts, such as those associated with changes in hydrogen plant feedstock, although these impacts may be significant.
- The RDEIR does not include the information necessary to understand and evaluate the environmental implications of the project. It did not describe the duration, setting, geographic or processing scope, feedstock, operation, or potential environmental effects of the project accurately or, in many cases, did not describe them at all. These informational deficiencies are so profound, and the revisions needed to cure them so extensive, that full independent review of a comprehensively revised draft would be necessary before public decisions could be based with confidence on this project’s environmental review.

53. I have given my opinions on these matters based on my knowledge, experience and expertise and the data, information and analysis discussed in this report.

I declare under penalty of perjury that the foregoing is true of my own knowledge, except as to those matters stated on information and belief, and as to those matters, I believe them to be true.

Executed this 5th day of December 2014 at Oakland, California

A handwritten signature in dark ink, appearing to read "G. Karras", is written over a horizontal line.

Greg Karras